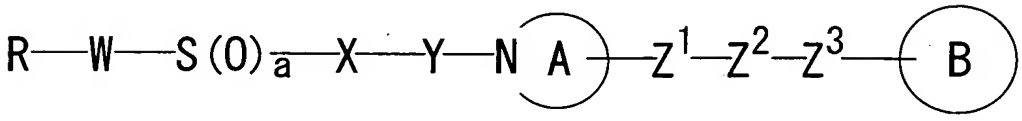
CLAIMS

1. A compound represented by the formula (I):



(I)

wherein R represents an optionally substituted cyclic hydrocarbon group or an optionally substituted heterocyclic group, W represents a bond or an optionally substituted divalent linear hydrocarbon group, X represents an optionally substituted divalent hydrocarbon group, Y represents -CO-, -S(O)-, $-S(O)_2-$ or a bond, ring A represents an optionally substituted pyrrolidine ring, an optionally substituted piperidine ring or an optionally substituted perhydroazepine ring, Z^1 and Z^3 independently represent a bond or an optionally substituted divalent linear hydrocarbon group, Z^2 represents $-N(R^1)-$, -O-, -S(O)-, $-S(O)_2-$, -CO-, $-CH(R^1)-$ or a bond (R^1 represents a hydrogen atom, an optionally substituted hydrocarbon group, an optionally substituted acyl group, an optionally esterified carboxyl group or an optionally substituted carbamoyl group), ring B represents an optionally substituted imidazole ring, wherein a substituent which the optionally substituted imidazole ring represented by ring B may have may be taken together with R^1 to form an optionally substituted ring, and a represents 0, 1 or 2, or a salt thereof.

2. A prodrug of the compound according to claim 1.

3. The compound according to claim 1, wherein R is an optionally substituted aryl group.

4. The compound according to claim 1, wherein R is naphthyl optionally substituted with a halogen atom or indolyl optionally substituted with a halogen atom.

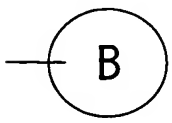
5. The compound according to claim 1, wherein W is a bond.

6. The compound according to claim 1, wherein X is an optionally substituted divalent linear hydrocarbon group.

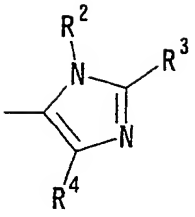
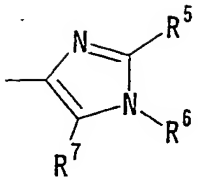
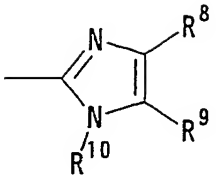
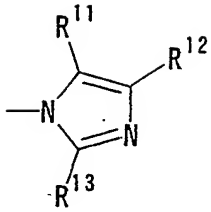
7. The compound according to claim 1, wherein Y is -CO-.

8. The compound according to claim 1, wherein ring A is an optionally substituted piperidine ring.

9. The compound according to claim 1, wherein the formula:

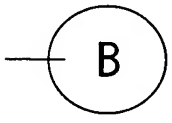


is the formula:

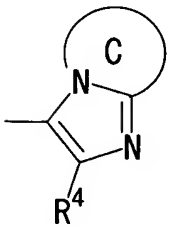



or


wherein R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11}, R^{12} and R^{13} independently represent a hydrogen atom, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted thiol group, an optionally substituted alkylsulfinyl group, an optionally substituted alkylsulfonyl group, an optionally substituted acyl group, an optionally esterified carboxyl group, an optionally substituted carbamoyl group or an optionally substituted amino group, or R^2 and R^3, R^5 and R^6, R^6 and R^7, R^8 and R^9, R^9 and R^{10}, or R^{11} and R^{12} may be taken together to form an optionally substituted ring.

10. The compound according to claim 1, wherein the formula:



is the formula:

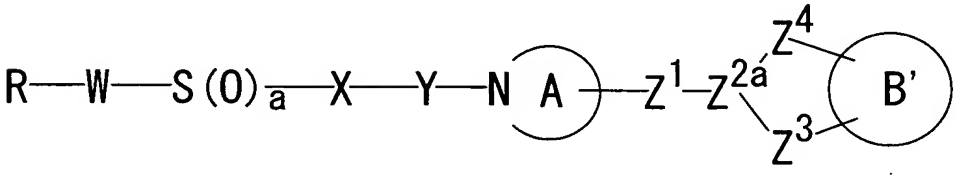


wherein ring C represents an optionally substituted nitrogen-containing heterocyclic ring, and other symbols are as defined in claim 9.

11. The compound according to claim 1, wherein a substituent which the optionally substituted imidazole ring represented by ring B may have and R^1 together do not form a ring.

12. The compound according to claim 1, wherein Z^2 is -$N(R^1)$- or -$CH(R^1)$- (R^1 is as defined in claim 1), and a substituent which the optionally substituted imidazole ring represented by ring B may have and R^1 are taken together to form an optionally substituted ring.

13. The compound according to claim 1, wherein the formula (I) is the formula (Ia):



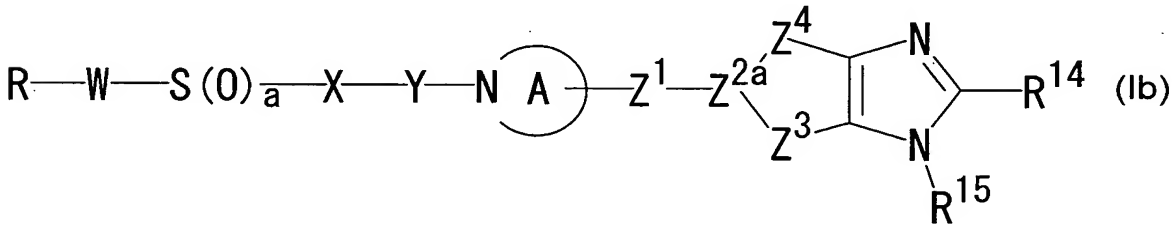
(Ia)

wherein ring B' represents an optionally further substituted imidazole ring, Z^{2a} represents N or CH, Z^4 represents an optionally substituted divalent linear hydrocarbon group, and other symbols are as defined in claim 1.

14. The compound according to claim 13, wherein Z^{2a} is a nitrogen atom.

15. The compound according to claim 13, wherein Z^3 and Z^4 are independently a divalent linear hydrocarbon group optionally substituted with an oxo group.

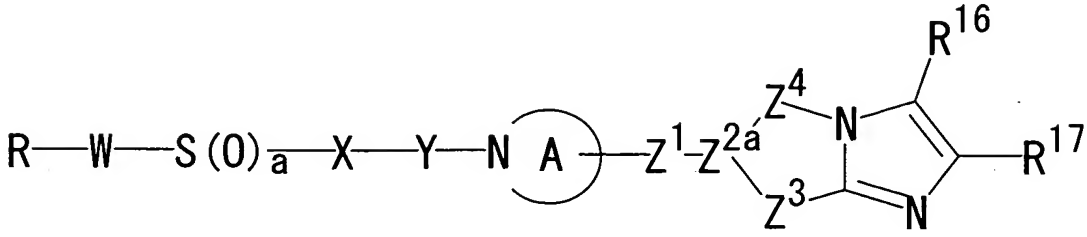
16. The compound according to claim 1, wherein the formula (I) is the formula (Ib):



(Ib)

wherein R^{14} and R^{15} independently represent a hydrogen atom, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted thiol group, an optionally substituted alkylsulfinyl group, an optionally substituted alkylsulfonyl group, an optionally substituted acyl group, an optionally esterified carboxyl group, an optionally substituted carbamoyl group, or an optionally substituted amino group, or R^{14} and R^{15} may be taken together to form an optionally substituted ring, and other symbols are as defined in claim 1 or 13.

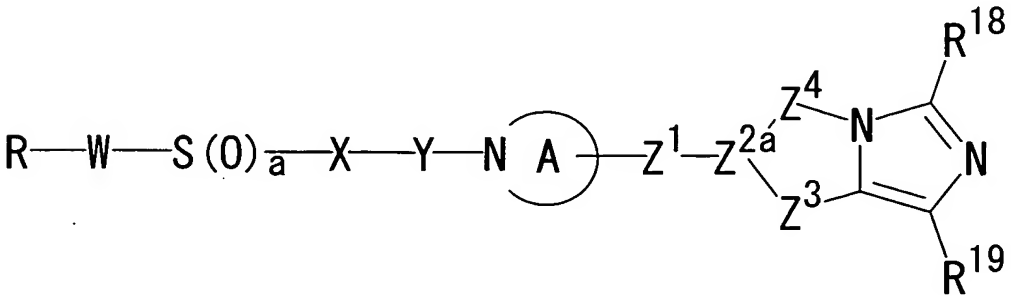
17. The compound according to claim 1, wherein the formula (I) is the formula (Ic):



(Ic)

wherein R^{16} and R^{17} independently represent a hydrogen atom, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted thiol group, an optionally substituted alkylsulfinyl group, an optionally substituted alkylsulfonyl group, an optionally substituted acyl group, an optionally esterified carboxyl group, an optionally substituted carbamoyl group or an optionally substituted amino group, or R^{16} and R^{17} may be taken together to form an optionally substituted ring, and other symbols are as defined in claim 1 or 13.

18. The compound according to claim 1, wherein the formula (I) is the formula (Id):



(Id)

wherein R^{18} and R^{19} independently represent a hydrogen atom,

an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted thiol group, an optionally substituted alkylsulfinyl group, an optionally substituted alkylsulfonyl group, an optionally substituted acyl group, an optionally esterified carboxyl group, an optionally substituted carbamoyl group, or an optionally substituted amino group, and other symbols are as defined in claim 1 or 13.

19. The compound according to claim 1, wherein a is 2.

20. A compound selected from the group consisting of 7-(1-{3-[(6-chloro-2-naphthyl)sulfonyl]propanoyl}-4-piperidinyl)-3-methyl-6,7-dihydroimidazo[1,5-a]pyrazin-8(5H)-one, 7-(1-{3-[(6-choloro-2-naphthyl)sulfonyl]propanoyl}-4-piperidinyl)-1-methyl-6,7-dihydroimidazo[1,5-a]pyrazin-8(5H)-one, 2-(1-{3-[(6-choloro-2-naphthyl)sulfonyl]propanoyl}-4-piperidinyl)-5-methyl-1,2-dihydro-3H-imidazo[1,5-c]imidazol-3-one, 2-(1-{3-[(6-choloro-2-naphthyl)sulfonyl]propanoyl}-4-piperidinyl)-5,7-dimethyl-1,2-dihydro-3H-imidazo[1,5-c]imidazol-3-one, 2-(1-{3-[(7-choloro-2H-chromen-3-yl)sulfonyl]propanoyl}-4-piperidinyl)-5-methyl-1,2-dihydro-3H-imidazo[1,5-c]imidazol-3-one, 2-[1-(3-{[(E)-2-(4-cholorophenyl)vinyl]sulfonyl}propanoyl)-4-piperidinyl]-5-

methyl-1,2-dihydro-3H-imidazo[1,5-c]imidazol-3-one, 2-(1-{3-[(5-chloro-1H-indol-2-yl)sulfonyl]propanoyl}-4-piperidinyl)-5-methyl-1,2-dihydro-3H-imidazo[1,5-c]imidazol-3-one, 2-(1-{3-[(6-chloro-2-naphthyl)sulfonyl]propanoyl}-4-piperidinyl)-5-(hydroxymethyl)-1,2-dihydro-3H-imidazo[1,5-c]imidazol-3-one, 2-(1-{(2S)-3-[(6-chloro-2-naphthyl)sulfonyl]-2-hydroxypropanoyl}-4-piperidinyl)-5-(hydroxymethyl)-1,2-dihydro-3H-imidazo[1,5-c]imidazol-3-one, [2-(1-{(2S)-3-[(6-chloro-2-naphthyl)sulfonyl]-2-hydroxypropanoyl}-4-piperidinyl)-3-oxo-2,3-dihydro-1H-imidazo[1,5-c]imidazol-5-yl]methyl 1-acetylpiperidine-4-carboxylate, [2-(1-{(2S)-3-[(6-chloro-2-naphthyl)sulfonyl]-2-hydroxypropanoyl}-4-piperidinyl)-3-oxo-2,3-dihydro-1H-imidazo[1,5-c]imidazol-5-yl]methyl 3-(2-oxo-1-pyrrolidinyl)propionate, [2-(1-{(2S)-3-[(6-chloro-2-naphthyl)sulfonyl]-2-hydroxypropanoyl}-4-piperidinyl)-3-oxo-2,3-dihydro-1H-imidazo[1,5-c]imidazol-5-yl]methyl (2-oxo-1-pyrrolidinyl)acetate, [2-(1-{(2S)-3-[(6-chloro-2-naphthyl)sulfonyl]-2-hydroxypropanoyl}-4-piperidinyl)-3-oxo-2,3-dihydro-1H-imidazo[1,5-c]imidazol-5-yl]methyl 4-(acetylamino)butanoate, and 2-(1-{(2S)-3-[(6-chloro-2-naphthyl)sulfonyl]-2-hydroxypropanoyl}-4-piperidinyl)-5,7-dimethyl-1,2-dihydro-3H-imidazo[1,5-c]imidazol-3-one or a salt thereof.

21. A pharmaceutical preparation which comprises the compound according to claim 1 or 2.

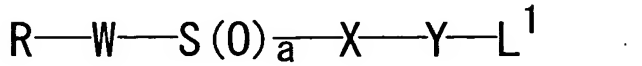
22. The pharmaceutical preparation according to claim 21, which is an anticoagulant.

23. The pharmaceutical preparation according to claim 21, which is an activated blood coagulation factor X inhibitor.

24. The pharmaceutical preparationn according to claim 21, which is an agent for preventing or treating myocardial infarction, cerebral infarction, deep venous thrombosis, pulmonary thromboembolism or arteriosclerotico-bliterans.

25. The pharmaceutical preparation according to claim 21, which is an agent for preventing or treating economy class syndrome, thromboembolism during or after an operation, or a secondary onset of deep venous thrombosis.

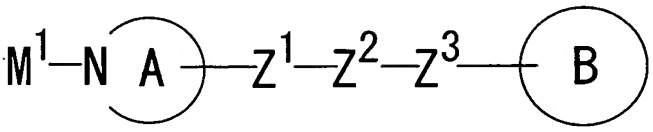
26. A process for preparing the compound according to claim 1, which comprises reacting a compound represented by the formula (II):



(II)

wherein L^1 represents a leaving group and other symbols are as defined in claim 1, or a salt thereof with a compound

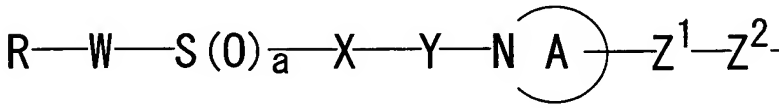
represented by the formula (III):



(III)

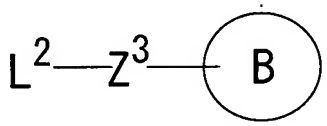
wherein M^1 represents a hydrogen atom, an alkaline metal, an alkaline earth metal or a leaving group, and other symbols are as defined in claim 1, or a salt thereof; or

reacting a compound represented by the formula (IV):



(IV)

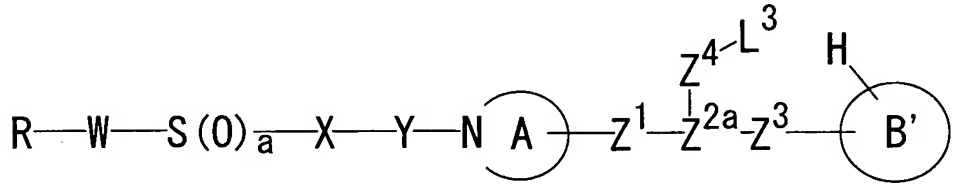
wherein M^2 represents a hydrogen atom, an alkaline metal, an alkaline earth metal or a leaving group, and other symbols are as defined in claim 1, or a salt thereof with a compound represented by the formula (V):



(V)

wherein L^2 represents a leaving group or a formyl group, and other symbols are as defined in claim 1, or a salt thereof; or

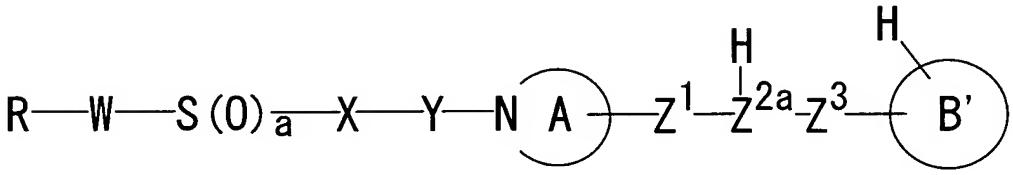
reacting a compound represented by the formula (Ie):



(Ie)

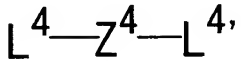
wherein L^3 represents a leaving group and other symbols are as defined in claim 1 or 13, or a salt thereof with a base; or

reacting a compound represented by the formula (If):



(If)

wherein symbols are as defined in claim 1 or 13, or a salt thereof with a compound represented by the formula (VI):



(VI)

wherein L^4 and $L^{4'}$ represent a leaving group and other symbols are as defined in claim 13, or a salt thereof; or

oxidizing a compound represented by the formula (Ig):

(Ig)

wherein symbols are as defined in claim 1, or a salt thereof, and optionally subjecting a compound obtained in the above reaction to hydrolysis, esterification, amidation, alkylation, acylation, reduction, oxidation or/and deprotection reaction.

27. A method for inhibiting blood coagulation in a mammal, which comprises administering an effective amount of the compound according to claim 1 or a prodrug thereof to said mammal.

28. A method for inhibiting activated blood coagulation factor X in a mammal, which comprises administering an

effective amount of the compound according to claim 1 or a prodrug thereof to said mammal.

29. A method for preventing or treating myocardial infarction, cerebral infarction, deep venous thrombosis, pulmonary thromboembolism or arteriosclerotic obliterans in a mammal, which comprises administering an effective amount of the compound according to claim 1 or a prodrug thereof to said mammal.

30. Use of the compound according to claim 1 or a prodrug thereof for manufacture of a medicament for inhibiting blood coagulation.

31. Use of the compound according to claim 1 or a prodrug thereof for manufacture of a medicament for inhibiting activated blood coagulation factor X.

32. Use of the compound according to claim 1 or a prodrug thereof for manufacture a medicament for preventing or treating myocardial infarction, cerebral infarction, deep venous thrombosis, pulmonary thromboembolism or arteriosclerotic obliterans.